Montell POLYOLEFINS

Machine condition information... a valuable resource for strategic management decisions

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Montell USA's Lake Charles polyolefins production facility is located in beautiful Southwest Louisiana, just 50 miles from the Gulf of Mexico.

To make fundamental changes, senior management needs more strategic information than a historical financial perspective often provides. Trended machine condition data and information can be a valuable source of this strategic information for virtually any level of management or operations. It provides answers to "why" and "what if" for a variety of process and manufacturing operations.

During the past year the Machine Reliability Group at the Lake Charles plant site established a goal to emphasize machine condition monitoring technologies in their plant.

Machine condition monitoring is perhaps the most technically demanding aspect of caring for machinery, and it is certainly the most critical activity for preventing unexpected equipment downtime due to component failure.

This strategic information can be used to identify potential unit cost reductions, increase net production capacity, improve product quality or performance, and identify areas where worker skills or safety needs improvement.

In fact, machine condition monitoring data and the information it creates can have a significant impact throughout a company: reduced unit production costs, reduced machinery life cycle cost, improved supplier performance, improved employee skills development and improved quality of the workplace.

If critical machinery in one of the Lake Charles plants fails, that entire process unit comes to a standstill. Therefore, during the 2nd quarter of 1996, and after careful evaluation of online data collection systems for effectiveness, reliability and cost, Montell USA made the decision to install the Bently Nevada Trendmaster® 2000 for Windows (TM2K) Remote Online Monitoring System in their polyethylene production facility.

The TM2K for Windows is specifically designed for efficient and compatible networking. Using Microsoft® Windows NT as the data acquisition server and Windows as

the display client, this system can be easily structured for plantwide or even worldwide accessibility, or as a traditional standalone system. Multiple networking protocol support makes it compatible with most existing and future corporate networking environments. The Windows Display Software enables you to access data from almost any computer, not just dedicated workstations.

The TM2K features used most frequently are Current Value readings and Trend and Timebase plots. Trend plots show daily maximum, minimum and average readings. Timebase plots display instantaneous amplitude of a signal as a function of time.

The recent installation of the TM2K monitoring system in the polyethylene plant included 159 accelerometers and 58 proximity transducers on machines in both the process and extrusion areas. Montell had previously used handheld data collectors which could only gather vibration data, not temperature or pressure information.

Almost immediately after installation, the TM2K System played a key role in preventing a 7-10 day shutdown. The system reduced Montell's maintenance costs and unscheduled downtime, and saved the company $750,000.

The application in question was a coupling attaching a 7000 hp AC synchronous motor to a twin-screw extrusion unit, "which is the heart of the extrusion process" (Figure 1).

Nine days after the TM2K system was turned on, vibration increased to the Alert status. Nine days later, vibration increased to the Danger level. Immediate action was required. The information is made available via a modem in the office, so it was called up on the computer to view the data. The

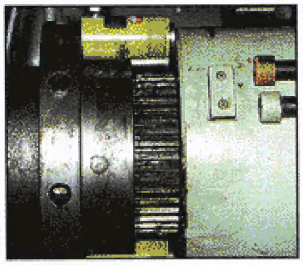

Figure 1. View of damaged coupling that connects the 7000 hp synchronous motor to the twin-screw extruder.

vibration was basically occurring at 3X running speed - on the drive end of the motor.

Management, with this strategic information available almost immediately, identified the problem and made the decision to break the machine down and take a look.

Trended data was also reviewed, and it was noticed that whatever was happening was progressive (Figure 2). Looking at the data, it was believed that the real "culprit" was the coupling, and it was decided to pull the coupling. That's exactly where the problem was. Three of the six coupling hub retainer bolts had broken and the remaining three bolts had been sheared off.

The problem was spotted very quickly and fixed in just 5 hours. If there had been a failure, much more of the machine would have been damaged - perhaps to the extent of a bent or broken extruder and motor shaft. Since there are employees working in the area around this machine, a flung coupling could have hurt someone.

A bent or broken extruder shaft would have required pulling the extruder gearbox apart (a 7-10 day job). A bent or broken motor shaft would have virtually the same effect. Either scenario would have cost the company in excess of $750,000.

In conclusion

The Machine Reliability Group at Lake Charles is committed to continuous learning, continuous development and continuous improvement. If we tolerate historical failure rates, historical maintenance costs, historical maintenance and operating practices...we, and our company, will ultimately become a part of history.

The TM2K system in the polyethylene unit began providing tangible benefits immediately after installation. Based on this experience, the TM2K system is being seriously considered for future projects.

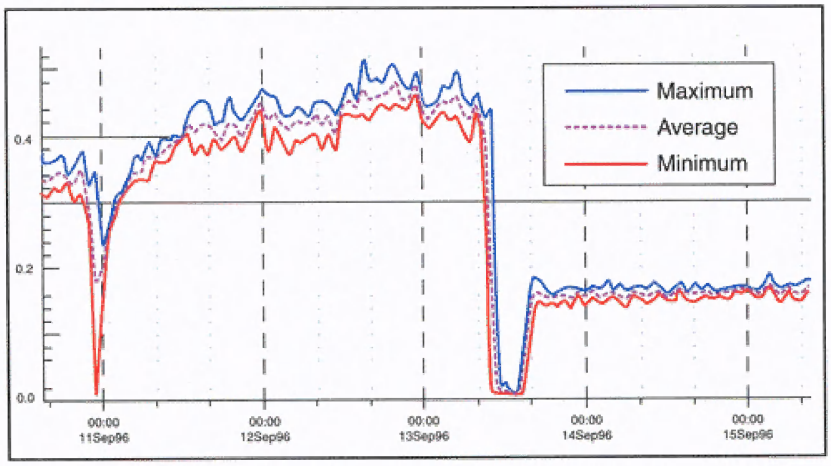

Figure 2. Vibration trend showing effect of damaged coupling and response after its repair.